

WE CLAIM:

1. A system for a lower extremity prosthesis comprising:
a foot;
an ankle;
a shank;
a posterior calf device on the prosthesis to store energy during force loading of the prosthesis and return the stored energy during force unloading to increase the kinetic power generated for propulsive force by the prosthesis in gait;
wherein the ankle and shank are formed by a resilient member which extends upward from the foot by way of an anterior facing convexly curved portion of the member, the lower end of the member being reversely curved in the form of a spiral.
2. The system according to claim 1, wherein the device includes at least one elongated member extending between an upper portion of the shank and a lower portion of the prosthesis, and at least one spring which is resiliently biased by the at least one elongated member in response to anterior movement of the upper end of the shank for storing energy.
3. The system according to claim 2, wherein the at least one spring includes a coiled spring with a free end connected to the elongated member, the coiled spring being resiliently expanded in response to anterior movement of the upper end of the shank.
4. The system according to claim 3, wherein the coiled spring is supported at the upper portion of the shank.
5. The system according to claim 4, wherein the elongated member is a flexible member which extends from the free end of the coiled spring to the lower portion of the prosthesis where it passes about a return and then extends upward to an upper portion of the shank.

6. The system according to claim 2, wherein the device includes a plurality of coiled springs each with a free end connected to the elongated member, each coiled spring being resiliently expanded in response to anterior movement of the upper end of the shank.

7. The system according to claim 2, wherein the elongated member extends between the upper portion of the shank and the radially inner end of the spiral of the lower end of the resilient member.

8. The system according to claim 7, wherein the elongated member is retained at the radially inner end of the spiral by a fastener arrangement joining the resilient member to the prosthesis.

9. The system according to claim 8, wherein the fastener arrangement includes a return about which the elongated member passes and then extends upward to the upper portion of the shank.

10. The system according to claim 2, wherein the device includes a plurality of springs each resiliently biased in response to anterior movement of the upper end of the shank for storing energy.

11. The system according to claim 2, wherein the elongated member is a curvilinear spring.

12. The system according to claim 11, wherein the distal end of the elongated member is connected to a coupling element connecting the resilient member to the foot.

13. The system according to claim 1, further comprising a spring located on an anterior side of the shank for engaging and stiffening the shank in the heel-off late mid-stance phase of gait.

14. The system according to claim 1, wherein the device includes a curvilinear spring extending between an upper portion of the shank and a lower portion of the prosthesis.

15. The system according to claim 14, wherein a distal end of the curvilinear spring is located within the reversely curved lower end of the resilient member.

16. The system according to claim 14, wherein a distal end of the curvilinear spring is connected to the reversely curved lower end of the resilient member.

17. The system according to claim 14, wherein the curvilinear spring of the device is monolithically formed with the resilient member.

18. The system according to claim 14, wherein a distal end of the curvilinear spring engages a coupling element connecting the resilient member and the foot.

19. An ankle and shank for a lower extremity prosthesis comprising:
an elongated, resilient member having one end which is reversely curved in the form of a spiral to connect with a longitudinally extending foot with the member extending upward from the foot by way of an anterior facing convexly curved portion of the member to form an ankle and shank for connection with a supporting structure on a person's leg stump;
a posterior calf device on the resilient member to store energy during force loading of the member in a prosthesis and return the stored energy during force unloading to increase the kinetic power generated for propulsive force by the prosthesis in gait.

20. The ankle and shank according to claim 19, wherein the device includes at least one elongated member to extend between upper and lower portions of the resilient member in a prosthesis, and at least one spring

connected to the member and resiliently biased by the at least one elongated member in the prosthesis in response to anterior movement of the upper end of the member in gait for storing energy.

21. The ankle and shank according to claim 20, wherein the at least one spring includes a coiled spring with a free end connected to the elongated member, the coiled spring being resiliently expanded in response to anterior movement of the upper end of the shank in a prosthesis.

22. The ankle and shank according to claim 21, wherein the coiled spring is supported at an upper portion of the member.

23. The ankle and shank according to claim 22, further comprising a fastener arrangement for connecting the one end of the resilient member with a foot to form the prosthesis, wherein the elongated member extends from the free end of the coiled spring to the fastener arrangement in a prosthesis where the elongated member passes about a return and then extends upward to an upper portion of the resilient member.

24. The ankle and shank according to claim 21, wherein the at least one spring includes a plurality of coiled springs each with a free end connected to the elongated member, each coiled spring being resiliently expanded in response to anterior movement of the upper end of the shank in a prosthesis.

25. The ankle and shank according to claim 20, wherein the elongated member extends between an upper portion of the resilient member and the radially inner end of the spiral lower end of the resilient member.

26. The ankle and shank according to claim 25, further comprising a fastener arrangement at the radially inner end of the spiral to join the resilient member to a foot in a prosthesis.

27. The ankle and shank according to claim 26, wherein the fastener arrangement includes a return about which the elongated member passes and then extends upward to the upper portion of the resilient member in a prosthesis.

28. The ankle and shank according to claim 20, wherein the device includes a plurality of springs each resiliently biased in response to anterior movement of the upper end of the shank in a prosthesis.

29. The ankle and shank according to claim 20, wherein the elongated member is a curvilinear spring.

30. The ankle and shank according to claim 29, wherein the distal end of the elongated member is connected to a coupling element for connecting the resilient member to a foot of a prosthesis.

31. The ankle and shank according to claim 19, further comprising at least one spring located on an anterior side of the resilient member for engaging and stiffening the shank in the heel-off late mid-stance phase of gait.

32. The ankle and shank according to claim 19, wherein the device includes a curvilinear spring extending between upper and lower portions of the shank.

33. The ankle and shank according to claim 32, wherein a distal end of the curvilinear spring is located within the reversely curved lower end of the resilient member.

34. The ankle and shank according to claim 32, wherein a distal end of the curvilinear spring is connected to the reversely curved lower end of the resilient member.

35. The ankle and shank according to claim 32, wherein the curvilinear spring of the device is monolithically formed with the resilient member.

36. The ankle and shank according to claim 32, wherein a distal end of the curvilinear spring engages a coupling element for connecting the resilient member and a foot of a lower extremity prosthesis.

37. A system for a lower extremity prosthesis comprising:
a foot;
an ankle;
a shank;
a posterior calf device on the prosthesis to store energy during force loading of the prosthesis and return the stored energy during force unloading to increase the kinetic power generated for propulsive force by the prosthesis in gait;

wherein the device includes at least one elongated member extending between an upper portion of the shank and a lower portion of the prosthesis, and at least one coiled spring with a free end connected to the elongated member, the coiled spring being resiliently expanded in response to anterior movement of the upper end of the shank for storing energy.

38. The system according to claim 37, wherein the coiled spring is supported at the upper portion of the shank.

39. The system according to claim 38, wherein the elongated member is a flexible member which extends from the free end of the coiled spring to the lower portion of the prosthesis where it passes about a return and extends back to an upper portion of the shank.

40. The system according to claim 37, wherein the elongated member is a flexible strap which extends between the upper portion of the shank and the ankle.

41. The system according to claim 37, wherein the ankle and shank are formed by a resilient member which extends upward from the foot by way of an anterior facing convexly curved portion of the member.

42. The system according to claim 41, further comprising a fastener arrangement joining the lower end of the resilient member to the foot, and wherein the elongated member extends from the upper portion of the shank to the fastener arrangement.